APPLICATION/REPORT OF WASTE DISCHARGE
GENERAL INFORMATION FORM FOR
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

Section VI – Other Required Information
And
Section VII - Other

Introduction –

On July 29, 2002, CE Obsidian Energy LLC filed an Application for Certification (AFC) with the California Energy Commission (CEC) seeking approval (through the six-month siting provisions) of the construction of a 185 MW geothermal power facility. A copy of the AFC was transmitted by the CEC to the Colorado River Basin Regional Water Quality Control Board (RWQCB). The following information includes excised portions of material contained in the AFC relevant to the Application/Report of Waste Discharge and is submitted after consultation with Michele Ochs, Associate Engineering Geologist with the RWQCB.

CE Obsidian specifically submits application for the following components of the Salton Sea 6 project for review by the RWQCB:

- Brine ponds (surface impoundments) – Section 6.4
- Mud sumps – Section 8.1
- Storm water management - Sections 9.1, 9.5

Reference to figures and drawings reflects numbering associated with the originally filed AFC for consistency purposes and to avoid confusion relating to these materials when the RWQCB reviews the AFC.

Construction of the facility is anticipated to commence upon issuance of the AFC. The overall project schedule is expected to take 26 months, with construction concluding in the first quarter of 2005.

1.0 Project Location and Description

The Salton Sea Unit 6 Project (SSU6 Project) consists of a proposed geothermal Resource Production Facility (RPF), a merchant class geothermal-powered Power Generation Facility (PGF), and associated facilities in Imperial County, California. The SSU6 Project will be owned by CE Obsidian Energy LLC (the Applicant), and operated by an affiliate of the Applicant, except for the transmission lines, which will be owned by the Imperial Irrigation District (IID).

The proposed project is located south of the Salton Sea. This region of the Imperial Valley is used mostly for agriculture and geothermal power production. Nine geothermal power plants are currently within 2 miles of the project area. The town of Niland is about 7.5

miles northeast, and the town of Calipatria is slightly over 6 miles southeast of the project. The Sonny Bono Salton Sea National Wildlife Refuge Headquarters is approximately 2,500 feet from the nearest well pad.

The project area is in the Obsidian Butte quadrant of Section 33 Southwest 4, T11 South, R13 East (Figure 3.1-2). The proposed power plant will be located on approximately 80 acres (Plant Site) of a 160-acre parcel. The plant site will be located on the north half of the block bounded by McKendry Road to the north, Severe Road to the west, Peterson Road to the south, and Boyle Road to the east.

The proposed RPF, including all brine handling facilities from the production well heads, through the crystallizer/clarifier system, to the injection well heads, and the proposed PGF would be underlain by a common groundwater resource. The RPF includes 10 brine production wells, on five new production well pads, expected to be drilled to a depth of about 7,400 feet with casings set at a depth of about 2,625 feet, a brine crystallizer/clarifier system, and seven brine injection wells, on three new injection well pads, expected to be drilled to reach depths of between 8,500 and 8,800 feet, and cased to depths of 3,650 to 5,250 feet. In addition to the brine injection wells, one well dedicated for cooling tower blowdown, and one well dedicated for aerated brine from the brine pond will also be constructed with screened intervals of between 1,200 and 2,250 feet.

Chemically stabilized brine flows from the steam handling system into the solids handling system where solids are removed, after which the brine is suitable for injection. The spent fluid (brine) is then pumped through the injection pipelines to seven brine injection wells. All production and injection wells will be operated in accordance with California Division of Oil, Gas and Geothermal Resources (CDOGGR) regulations

2.0 Site Characteristics

Alluvial and non-marine deposits underlie the facility area. The facility site is within the USGS cataloging unit, Salton Sea, 10255550, and then subsequently within the hydrologic unit (HU), Brawley, 723.10. HU 723.1 has an area of 1.324 million acres, and is contained within the southern portion of Imperial County south to the U.S.-Mexico border. A series of agricultural irrigation lateral supply canals and drains flow from south to north to the Salton Sea within and nearby the site location. Two irrigation drains, Vail Lateral Drain 4a and Vail Lateral Drain 5, drain to the Salton Sea and are on the east and west sides of the project site, respectively. All drainage from the area of the project site drains toward Salton Sea. Figures 5.4-A through 5.4-5E display the general site location as it relates to adjacent surface waters.

The SSU6 Project site is in an arid environment and, based on a rain gauge approximately 26 miles south of the site (in El Centro), receives less than 3 inches of precipitation annually. The average monthly precipitation based on 52 years worth of data is provided in the table below.

MONTHLY PRECIPITATION AT EL CENTRO, COLLECTED FROM 1948 TO 2000

Monthly Average Precipitation (in.)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.244	0.170	0.051	0.018	0.0	0.072	0.281	0.243	0.261	0.143	0.246

The annual precipitation for the past 10 years with the highest recent annual precipitation of 7.7 inches and the lowest of 0.3 inches and is summarized below.

ANNUAL PRECIPITATION FOR EL CENTRO FROM STORM SEASON 1990-91 TO 1998-99

Annual Precipitation (in.)								
90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99
2.8	5.5	7.7	1.7	2.7	0.3	2.3	2.4	1.0

The Imperial County General Plan indicates that the project site is in an area inside the 100-year floodplain. The site is within Federal Emergency Management Agency (FEMA) Zone A, which is considered an area within the 100-year floodplain and Zone D, which is considered an undetermined, but possible, flood hazard zone (FEMA, 1984) Groundwater in the upper Coachella Valley occurs in a thick sequence of Cenozoic-age alluvial sediments that overlie a pre-Tertiary age basement complex. These sediments, consisting primarily of sand and gravel, form the aquifers in the project area. Faulting in the valley has offset these sediments creating barriers to groundwater flow. Based on these fault barriers and their effect on the groundwater flow, the valley is divided into four groundwater sub-basins. The SSU6 Project site overlies the Garnet Hill Sub-Basin. The aquifer-bearing alluvial sediments beneath the proposed SSU6 Project area reportedly include:

- A lower sequence of mostly non-marine Tertiary age sedimentary rocks;
- A middle unit of Miocene- or Pliocene-age marine sedimentary rocks, the Imperial Formation; and
- An upper lacustrine sequence of mostly non-marine Pliocene or Quaternary age deposits that comprises the main aquifer beneath the Imperial Valley. These deposits have locally been intruded by rhyolitic magma that is the heat source of the geothermal reservoir to be used by the SSU6 Project.

The upper sequence is typically several thousands of feet thick and consists primarily of clay, silt and some sand that have been subdivided into the Borrego and Brawley

Formations and the overlying deposits of Lake Cahuilla. This upper sequence includes shallow aquifers that are recharged predominantly by imported Colorado River water used for agricultural irrigation that discharges to the Salton Sea, and much deeper groundwater including the Salton Sea Geothermal Field that may contain moderately altered connate ocean water.

3.0 Water Resources

The proposed power plant facility will be located approximately 0.3 miles from the edge of the existing Salton Sea coastline. The facility site is also between two perennial water bodies that discharge to the Salton Sea (the New River and the Alamo River). The New River is approximately 2.7 miles east of the facility site, while the Alamo River is approximately 4.8 miles southwest.

3.1 Surface Water Resources

The three major water bodies near the proposed facility include the Salton Sea, the New River, and the Alamo River. The two adjacent irrigation and drainage systems, Vail Lateral 4a and Vail Drain 4a, and Vail Lateral 5 and Vail Drain 5, also currently maintain flow based on irrigation practices.

The level of the Salton Sea is approximately 240 feet below sea level. Flow into the Salton Sea is primarily fed by irrigation drainage water via surface water flows and ground water percolation. Storm water runoff also contributes to the Salton Sea during the rainy season. Levels of the Salton Sea increase during periods of peak irrigation water usage, but overall levels of the Salton Sea are decreasing.

The New and Alamo Rivers are both perennial streams with headwaters starting in Mexico. Both the New and Alamo Rivers convey predominantly agricultural irrigation drainage and some treated wastewaters. The New River also receives a considerable portion of untreated wastewater flows from Mexicali, Mexico. Irrigation water is imported from the Colorado River.

There are USGS gauges on both rivers near the proposed facility. USGS gauge 10254670, on the Alamo River near Calipatria, has recorded flow data since 1972. USGS gauge 10255550, on the New River near Westmorland, has recorded flow data since 1952. These approximate gauge locations are shown in Figures 5.4-1A through 5.4-5.E.

3.2 Groundwater Resources

The amount of usable near-surface groundwater in the central Imperial Valley is unknown, but this resource has not been significantly exploited because of low well yields and poor chemical quality. The upper 500 feet of fine-grained deposits in the central portion of the Imperial Valley are estimated to have a transmissivity of less then 10,000 gallons per day. Even lower permeabilities are estimated to occur at greater depths (Westec, 1981), and low vertical permeability inhibits mixing of waters from different depths such as between the shallow aquifer system and underlying deeper groundwater that includes the geothermal resources.

The main source of groundwater recharge to the shallow aquifer system, and likely to a lesser extent the deeper aquifer, is imported Colorado River water that seeps from canals and is applied as irrigation to cultivated area. Shallow groundwater, ranging in depths from about 5 to 20 feet, is drained by an extensive network of ditches and drains in agricultural areas and also discharges into the Alamo and New Rivers that drain toward the Salton Sea.

The shallow groundwater gradient beneath the proposed SSU6 Project area appears to mimic that of the overlying surface topography, and is reported to generally flow toward the axis of the Imperial Valley, and then northward to the Salton Sea (Westec, 1981). At depths of between 100 and 200 feet, the average groundwater gradient has been estimated at about 28 feet per mile toward the west near Niland and about 9 feet per mile toward the northeast near Calipatria. The main source of ground water recharge in both of these areas is suspected to be seepage from the East Highline and Coachella Canals. Historical records of water wells completed at relatively shallow depths of about 100 to 150 feet are reported to indicate an upward vertical movement of groundwater near the Salton Sea (Westec, 1981). This condition is consistent with discharge of groundwater from these depths toward the Salton Sea. Groundwater discharge from the Imperial Valley into the Salton Sea has been estimated to be about 2,000 afy (U.S. Department of Interior and Resource Agency for California, 1974).

The amount of water in the deep aquifer has been estimated at 1.1 billion to 3 billion acre-feet, and the total recoverable water has been estimated to be about 20 percent of the total. The deep aquifer is recharged with about 400,000 acre-feet of water per year. Some of the deepest groundwater in this aquifer system is believed to be moderately altered residual ocean water. Above this may be relatively fresh residual water of low to moderate salinity from prehistoric lakes that had filled the Salton Trough. Water in the upper portion of the deep aquifer is high temperature and locally of high salinity

4.0 Area Water Quality

4.1 Surface Water Quality

The beneficial use designations for surface water bodies as specified by the RWQCB are listed below.

Salton Sea:

- Aquaculture
- Industrial Service Supply (potential)
- Water Contact Recreation
- No-Contact Water Recreation
- Warm Fresh Water Habitat
- Wildlife Habitat
- Preservation of Rare, Threatened, or Endangered Species

All American Canal System:

- Municipal and Domestic Supply
- Agricultural Supply
- Aquaculture
- Freshwater Replenishment
- Industrial Service Supply
- Ground Water Recharge
- Water Contact Recreation
- Non-Contact Water Recreation
- Warm Fresh Water Habitat
- Wildlife Habitat

- Hydropower Generation
- Preservation of Rare, Threatened, or Endangered Species.

Alamo River, New River, and Imperial Valley Drains including the Vail Drains:

- Freshwater Replenishment
- Water Contact Recreation
- Non-Contact Water Recreation
- Warm Fresh Water Habitat
- Wildlife Habitat
- Preservation of Rare, Threatened, or Endangered Species.

Additionally, the New River has designated potential beneficial use for industrial supply purposes, and the Alamo River has potential beneficial use for hydropower generation. Finally, it should be noted that water contact is unauthorized in the Vail Drains and the New River is unfit for any recreational use because of contamination.

The Salton Sea has a history of water quality issues associated with increasing salinity and nutrient concentrations. The New and Alamo Rivers both drain from the south from Mexico, through agricultural lands of the Imperial Valley and discharge to the Salton Sea, and also have histories of poor water quality. The Clean Water Act (CWA) section 303(d) requires the state to list waterbodies not meeting water quality under certain CWA conditions. The New River is listed for bacteria, nutrients, pesticides, and sedimentation/siltation, while the Alamo River is listed for pesticides, sedimentation/siltation, and selenium. The sources of pollutants are all designated as agricultural runoff. The Salton Sea is listed under 303(d) for nutrients, salinity, and selenium with sources designated as agricultural return flows.

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4.2 Groundwater Quality

The SSU6 Project site is in the Imperial Hydrologic Unit (Area Code 723.00) of the Imperial Valley Planning Area (Regional Water Quality Control Board [RWQCB], 1994). The Imperial Valley Planning Area encompasses about 2,500 square miles. Groundwater in the Imperial Hydrologic Unit has designated beneficial use for industrial supply purposes. Additionally, a small portion of the groundwater in this hydrologic unit is also designated as having beneficial use for municipal purposes. However, based on the Sources of Drinking Water Policy (State Water Resources Control Board [SWRCB] Res. No. 88-63), groundwater is exempted from municipal beneficial use designation if total dissolved solids (TDS) exceed 3,000 mg/l and it is not reasonably expected by the Regional Water Quality Control Board to supply a public water system, or the aquifer is regulated as a geothermal producing source.

Because low vertical permeabilities inhibits mixing of waters from different depths, the quality of water in the upper sequence of deposits that comprises the main aquifer beneath the Imperial Valley varies locally from fresh to saline. For example, relatively shallow wells west of the Alamo River typically have water of very poor chemical quality while artesian wells east of the Alamo River can yield relatively good quality water with TDS content of 1,000 to 2,000 mg/l.

Historical records indicate relatively shallow groundwater that was tapped by drains, was of a sodium chloride type with high TDS (15,700 mg/l) and salinity ascribed to evaporation of shallow groundwater. Deeper waters were also found to be sodium chloride in nature, but had lower TDS (1,500 to 1,600 mg/l) and salinity.

The proposed power plant facility will be located approximately 0.3 miles from the edge of the existing Salton Sea coastline. The facility site is also between two perennial water bodies that discharge to the Salton Sea, the New River, and the Alamo River. The New River is approximately 2.7 miles east of the facility site, while the Alamo River is approximately 4.8 miles southwest.

5.0 Water Supply

The facility will be designed to be self-sufficient with regard to water supply to the greatest extent practical. Condensed steam from the geothermal resource will provide make-up water for the cooling tower and dilution water for the RPF. Condensed steam will also be the source of scrubber wash water and will be the source of seal water for the mechanical pump seals (the scrubber wash water and mechanical seal water supply is maintained in the purge water tank). Combined, these will constitute over 95 percent of the facility's water needs on an annual average basis.

5.1 IID Canal Water

The source of external freshwater for the facility will be IID canal water. The IID maintains an established canal water delivery system across the large agricultural areas in the Imperial Valley to distribute water from the Colorado River. Water from this canal will be directed through a reverse osmosis (RO) system with treatment to supply the facility's potable water and service water systems, including shower, eyewash equipment, wash basin water, toilets in crew change quarters, and sink water in the sample lab. It will also be the source of dilution water for the RPF. The IID canal water will also be used for fire water, for RPF and PGF cement slab washdown, for landscaping around the control building (via a small aprinkler/buller irrigation system), and for various non-potable applications in the control building and elsewhere in the facilities. The anticipated water quality for this water source is contained in the following table**:**

EXPECTED WATER QUALITY
(All units ppm as ions, pH)

Constituent	IID Canal Water
Hydrogen	0.3
Sodium	72.5
Magnesium	24.5
Potassium	4.0
Calcium	67.1
Manganese	ND
Iron	ND
Copper	ND
Strontium	1.0
Silver	0.1
Bicarbonate	131.3
Nitrate	0.3
Sulfate	216.4
Chlorine	67.5
Silicon Dioxide	12.6
Carbon Dioxide	2.3
Total Dissolved Solids	600.0
Potential of Hydrogen	7.5

ND = Not Detected

The delivery point for the IID canal water will be the Vail 4A Lateral, Gate 460 at the southeast corner of the proposed power plant site, along Boyle Road. Transfer to the service water pond will be via a proposed 500-foot-long buried 10-inch pipeline. The water is then used for dilution water and other process uses and the RO potable water system.

A Water Balance for summer design conditions is shown in Figure 3.3-9. The SSU6 project requires an average of 293 acre-feet per year (AFY) of water when operating at full plant load for uses primarily including reverse osmosis and dilution.

The expected daily and annual water use for the SSU6 Project are shown in the table below. Average annually supply requirements will vary, depending on the capacity factor of the overall facility. These estimates for water supply from outside sources are based on a project design case of 23.5 percent salinity in the brine.

ESTIMATED DAILY WATER SUPPLY REQUIREMENTS

IID Canal Water	Average Usage (design conditions)	Summer Usage (design conditions)
RO Water (Potable, Sanitary, and Domestic Use) Dilution Water and Other Process Uses	2,160 gpd 259,200 gpd	2,160 gpd 259,200 gpd
Total	**261,360 gpd**	**261,360 gpd**

5.2 Heat-Depleted Brine

The produced fluids from brine production and processing constitute 95 percent of the plant's water demand. The brine is anticipated to be produced from 10 production wells, to be located on five well pads. Production brine will be piped through a 13-3/8-inch titanium or carbon steel string (wellbore piping), with a 16-inch wellhead piping and valves. Each well will produce an average of approximately 1,500 kph (1 kph = 1,000 pounds per hour) of a mixture of steam vapor, non-condensible gases, and brine in a two-phase flow. Expected properties of the produced are as follows:

- 235,000 ppm total dissolved solids (TDS)
- 0.3 percent non-condensible gas (at high pressure separation pressure)
- Total enthalphy: 400.9 Btu/lb
- Equivalent Reservoirs Temperature: 535°F

The chemical composition of the produced fluids is shown in the following table:

EXPECTED CHEMICAL COMPOSITION OF PRODUCED FLUIDS
CONSTITUENT CONCENTRATION
(ppm)

Hydrogen (H^+)	ND
Lithium (Li^+)	187
Beryllium (Be^{+2})	ND
Ammonium (NH_4^+)	369
Sodium (Na^+)	50,169
Magnesium (Mg^{+2})	39
Aluminum (Al^{+3})	ND
Potassium (K^+)	12,784
Calcium (Ca^{+2})	24,584
Chromium (Cr^{+3})	ND
Manganese (Mn^{+2})	983
Iron (Fe^{+2})	1,180
Nickel (Ni^{+2})	ND
Copper (Cu^{+2})	4
Zinc (Zn^{+2})	320
Rubidium (Rb^+)	69
Strontium (Sr^{+2})	443
Silver (Ag^+)	ND
Cadmium (Cd^{+2})	1
Antimony (Sb^{+3})	1
Cesium (Cs^+)	12
Barium (Ba^{+2})	177
Mercury (Hg^{+2})	ND
Lead (Pb^{+2})	79
Bicarbonate (HCO_3^-)	69
Nitrate (NO_3^-)	ND
Fluorine (F^-)	20
Sulfur Monoxide (SO_1^{-2})	98
Chlorine (Cl^-)	137,670
Arsenate (AsO_4^{-3})	20
Selenate (SeO_4^{-2})	ND
Bromine (Br^-)	89
Iodine (I^-)	10
Silicon Dioxide (SiO_2)	433
Carbon Dioxide (CO_2)	3,309
Boric Acid ($B[OH]_3$)	1,800
Hydrogen Sulfide (H_2S)	15
Ammonia (NH_3)	59
Methane (CH_4)	10
Total Dissolved Solids (TDS)	235,000
Potential of Hydrogen (pH)	5.5

ND = Not Detected

6.0 Fluid Processes and Treatment

The geothermal production process is essentially a closed loop system in which the geothermal fluids are extracted from production wells deep below the Earth's surface. High-, standard- and low-pressure steam is extracted from two-phase brine and sent to the steam turbine for power generation. The brine from each of the pressure separators is routed to a crystallizer. The crystallizers are vertical vessels that are injected with silica-laden seed material to stabilize the brine and minimize the adhesion of silicate scale. In additional to chemically stabilizing the brine, the crystallizer separates the brine for further processing through each phase. Overpressure venting systems are included for system protection, with vented fluids directed through an emergency relief tank to the brine pond.

The low pressure brine, after processing, is directed to an atmospheric flash tank that operates near atmospheric pressure. Brine from the lower pressure crystallizers discharges into the respective trains' Atmospheric Flash Tanks (AFT). Brine from these flash tanks flows by gravity to the brine clarification system. The AFT steam from each of the four trains is directed to one of two dilution water heaters. In these vessels, the atmospheric steam contacts turbine hotwell condensate or IID canal water to produce heated deaerated dilution water for injection into the low pressure crystallizer.

6.1 Primary and Secondary Clarifiers

The heat-depleted brine is directed to the brine clarification system for brine polishing (the final stage of chemical stabilization followed by suspended solids removal) prior to injection. The brine clarification system consists of two parallel trains of primary and secondary clarifiers. The parallel trains provide an added measure of system reliability, and allow the plant to remain online while one train is taken out of service for maintenance.

Brine from the AFTs flows first to the primary clarifier in one of the two clarifier trains. Flocculation occurs in the primary clarifiers to enhance the brine polishing process. From the primary clarifier, the brine flows to the clarifier train's secondary clarifier. The secondary clarifier further polishes the brine for injection back into the brine reservoir in a condition that will not cause significant damage to the injection wells. The solids generated in the clarification system are directed to the vacuum filter press system for solids dewatering. Both the primary clarifiers and the secondary clarifiers are capped with steam to prevent oxygen intrusion, and each has alloy components to minimize corrosion. The primary and secondary clarifiers will each be equipped with overflow pipes, which discharge to the brine pond.

6.2 Solids Dewatering

A dilute slurry from the underflow of the clarification system is directed to one of two vacuum filter presses for solids dewatering. Silica-based materials are separated from the slurry in a continuous belt filtration process. The filter cake is loaded by one of two covered conveyor belts directly into end-dump trailers. After loading, these trailers are covered to minimize fugitive dust emissions. These trailers are stored for up to five days while an analysis of the solids is performed to confirm the regulatory classification as a nonhazardous waste. If the filter cake is determined to be a hazardous waste, the solids are transferred to a Class I regulated landfill. Nonhazardous filter cake will be transferred to a Class II regulated landfill for disposal.

The filtered effluent is directed to one of two thickeners. The thickener is designed to recover solids not captured in the filtration system. Slurry from the thickener is directed back to the inlet of the filtration system for dewatering. Liquid from the thickener is directed to an injection well.

The polished brine from the secondary clarifier is pumped from the RPF to the remote injection well pads via aboveground pipelines. Four booster and four main injection pumps (each at 67 percent total brine flow capacity, two pump sets for each clarifier train) deliver the heat-depleted brine to the injectors through cement-lined carbon steel injection lines. Each injector is remotely metered for pressure, temperature, and flow rate.

6.3 Pumping Station

The pumping station will be equipped with two sets of 67 percent pump trains for each clarifier train. Each pump train will consist of a booster pump and a main injection pump. The pumps will be designed for the required pressure once the post-drilling testing is complete. The pumping station will include a local control panel. The main control for this pumping station will be included both within a motor control center and within the main control room for the SSU6 Project.

6.4 Brine and Service Water Ponds

Two 770-foot by 90-foot by 10-foot-deep brine ponds will be installed. The ponds will be designed in accordance with Title 27, Division 2 of the California Code of Regulations – Special Requirements for Surface Impoundment. These ponds will be of earth construction and lined with an HDPE liner and concrete. Monitoring wells will be placed around the periphery of the ponds.

Figure 3.3-7 depicts the plan, section, and detail of both brine ponds within the plant facility. The brine ponds are large cement-lined basins that are sized to accommodate up to four hours of brine released under upset conditions, plus 2 feet of freeboard. During such upset conditions, brine that overflows from the clarifiers and the thickener, and condensate from the steam vent tanks would be directed to these ponds for temporary containment, after which this liquid is pumped to the aerated brine injection well located at the facility. Reject water from the RO system will also be directed to the brine ponds. Oxygenated brine effluent in the clarifiers would be directed to the brine pond during maintenance shutdowns.

The brine ponds would also collect brine from the production wells when they are flow-tested after drilling and from the production wells when brine is initially introduced into the facility during startup. This liquid would be discharged into an injection well after startup is complete. Monitoring wells are installed adjacent to the brine ponds to comply with regional ground water regulations.

During initial startup, the warmup header will feed into a warmup line, which will discharge into the production test unit located near the brine pond. Liquid from the production test unit will discharge into the brine pond.

If 700,000 cubic feet of solid waste from drilling operations (a conservative estimate) were collected in mud sumps, this quantity would represent less than 2 percent of the total permitted capacity of the Monofill Facility landfill. The Monofill Facility has already permitted additional land for landfill use and will continue to add landfill capacity as needed. Drilling wastes would not significantly affect the available landfill capacity and are considered a less-than-significant impact.

The service water pond (136,000 square feet) will be a lined earthen structure that would hold only canal water for facility service water needs. The storm water detention pond (96,000 square feet) will also be an earthen structure.

6.5 Cooling Towers

Liquid from the condenser will be directed to a biological oxidizer that will be located in one cell of each tower. The biological oxidizer uses microorganisms to convert the hydrogen sulfide in solution to sulfate in the condensate. Oxidizers have been installed at other existing Salton Sea geothermal facility cooling towers. In practice, these oxidizers have reduced hydrogen sulfide concentration levels down to nondetectable levels in the cooling tower exhaust. After treatment in the oxidizer, treated condensate will then flow into the cooling tower basins to be used to offset water lost in evaporation or a storage tank to be used in the solids dewatering system. Second, condensate will be routed to a condensate storage tank and will then be used for other plant water demands such as the dilution water system, steam scrubbing water, and pump seal flush water. Any excess condensate not required for plant use will be routed to the excess condensate injection well located in the plant.

7.0 Injection Wells/Process

7.1 Brine Injection

After brine processing and utilization of brine throughout the plant, the spent brine is reinjected into the geothermal reservoir to replenish the reservoir. The injection wells will be operated in accordance with California Division of Oil, Gas and Geothermal Resources (DOGGR) regulations. The brine injection area was sited south of the main blind fault and at an adequate distance from existing or proposed production wells, in an area that would not be considered for production, yet is close enough to give pressure support.

A total of seven injection wells will be located on three new injection well pads. The injection well pads will be located southeast of the RPF, as shown in Figure 3.1-4. Wells are expected to be drilled to reach depths of between 8,500 feet and 8,800 feet. Injection wells will be cased to a depth where static subsurface temperatures are above 480 °F and where rocks are stable. The injection wells are planned as low-angle slant or “S”-shaped wells to minimize displacement from the wellhead and be able to intercept fractures of multiple orientations.

Seven injection wells will be dedicated to the injection of secondary clarifier effluent. One additional injection well is dedicated to the cooling tower blowdown, and one additional injection well to the brine pond liquids. These two plant wells will be located on the plant site. The amount and characteristics of these streams are summarized in the table below.

COOLING TOWER BLOWDOWN AND INJECTED PROCESS BRINE FLUID CHARACTERIZATION (mg/L as Ions)[1]

Constituent	Cooling Tower Blowdown	Clarifier	Brine Pond
Lithium	0.067	228.5	253.3
Beryllium	0.000	0.01	0.01
Ammonium	376.573	451.1	500.0
Sodium	18.077	61,369.2	68,024.0
Magnesium	0.014	48.9	53.3
Aluminum	0.000	0.3	0.3
Potassium	4.606	15,637.1	17,333.3
Calcium	8.858	30,073.4	33,333.3
Chromium	0.000	0.004	0.004
Manganese	0.354	1,202.8	1,333.3
Iron	0.425	1,443.4	1,600.0
Nickel	0.000	0.02	0.03
Copper	0.001	4.8	5.3
Zinc	0.115	390.9	433.3
Rubidium	0.025	84.2	93.3
Strontium	0.159	541.3	600.0
Silver	0.000	0.3	0.3
Cadmium	0.000	1.5	1.7
Antimony	0.000	1.0	1.1
Cesium	0.004	15.0	16.7
Barium	0.064	216.5	240.0
Mercury	0.055	0.0001	0.004
Lead	0.028	96.2	106.7
Bicarbonate	0.025	88.6	93.3
Nitrate	0.000	0.01	0.0
Fluoride	0.007	24.1	26.7
Sulfate	699.590	127.5	133.3
Chloride	47.032	168,400.5	186,666.7
Arsenic	0.004	13.2	14.7
Selenium	0.000	0.006	0.007
Bromine	0.032	108.3	120
Iodine	0.004	12.0	13.3
Silica	0.156	206	586.7
Carbon Dioxide	0.000	0.1	2,006.7
Boron	0.113	384.8	426.58

Constituent	Cooling Tower Blowdown	Clarifier	Brine Pond
Hydrogen Sulfide	0.000	0.0	20.1
Benzene	0.000	0.0	0.003
Total Dissolved Solids	1168.0	283,323	316,063.4
PH	8.4	**4.5 to 5.1**	**4 to 7**

[1]Note: All numbers are approximate.

7.2 Liquid Process Wastes

Waste streams are included with other process streams in the Water Balance Diagram (Figure 3.3-9). The flow rates shown are based on summer ambient conditions with operations at 100 percent load. The primary discharge will consist of spent brine from the secondary clarifiers that is injected directly into the injection wells to replenish the geothermal resource. Process brine waste characteristics are summarized in the table below.

Under overflow conditions, this brine would be directed to the brine pond, after which it would be injected into a separate dedicated injection well. This dedicated injection well would also receive liquid from the thickener, which collects filter press filtrate, and liquid from the bermed areas around the plant equipment. The brine pond also receives liquid from the emergency relief tanks and rejects water from the RO system. Monitoring wells would be provided adjacent to the brine pond to comply with RWQCB ground water regulations. Brine injection will take place in accordance with California Department of Oil and Gas regulations.

A secondary source of wastewater is blowdown from the cooling towers. This wastewater will be injected into one of the two dedicated injection wells.

The sanitary drains will discharge to a septic tank. Waste from the septic tank will be pumped out regularly. Rain and storm drainage will be collected in the drainage water detention pond on the northwest corner of the facility location. The drainage pond is designed for 3 inches of precipitation in a 24-hour period (100-year storm conditions). Water accumulation will be injected into one of the two dedicated plant injection wells.

8.0 Other Process Wastes

8.1 Construction Related Wastes

8.1.1 Drilling Wastes/Mud Sumps

Wet drilling wastes consist of soils, brine effluent, and other materials removed from the ground during the construction of production and injection wells. This waste would dry out in RWQCB-permitted, clay-lined mud sumps, constructed in accordance with RWQCB regulations. The remaining solid waste would be tested for hazardous characteristics before disposal. Non-hazardous drilling wastes would be sent to Desert Valley Company’s Monofill Facility, a Class II landfill. The Monofill facility is owned by an affiliate of CE Obsidian

Energy LLC (the Applicant). If 700,000 cubic feet of solid waste from drilling operations (a conservative estimate) were collected in mud sumps, this quantity would represent less than 2 percent of the total permitted capacity of the Monofill Facility landfill. The Monofill Facility has already permitted additional land for landfill use and will continue to add landfill capacity as needed. Drilling wastes would not significantly affect the available landfill capacity and are considered a less-than-significant impact.

If testing indicates that any load of drilling wastes is hazardous in character, it would be appropriately disposed of at a Class I hazardous waste landfill.

8.1.2 Non-Hazardous Liquid Wastes

Non-hazardous liquid wastes generated during construction would be mainly wastewater generated from sanitary waste, pipe hydrotesting, and equipment washing. Sanitary waste would be collected in portable, self-contained toilets serviced by an outside contractor. Approximately 440 gallons per day of sanitary wastes from portable chemical toilets would be pumped by licensed contractors and transported to a sanitary water treatment plant. Equipment wash water and hydrotest water would be contained in tanks or other storage containers at specifically designated areas. If the water is thought to contain free-phase hydrocarbons, it would be run through an oil/water separator. Oil removed from the oil/water separator would be collected and taken off site by an oil recycler. The remaining water would be tested to determine its final disposition. If the water is contaminated, it would be removed from the site and disposed of at a liquid disposal facility. If the water is suitable for discharge, it would be discharged to an Imperial Irrigation District (IID) drain canal. For construction activities, a Storm Water Pollution Prevention Plan (SWPPP) would be developed and implemented in accordance with all applicable state and local requirements.

8.2 Operating Related Wastes

The operation of the SSU6 facility is anticipated to produce the following wastes:

8.2.1 Non-Hazardous Solid Wastes

Operation and maintenance of the plant would generate non-hazardous solid wastes typical of geothermal power generation facilities in the Salton Sea area. These wastes would be composed primarily of a filter-cake of solids that would have been removed from the geothermal brine fluid. Filter-cake wastes, like drilling wastes produced during construction, would be tested for hazardous characteristics before disposal. It is anticipated that the 120 tons per day of generated filter-cake wastes would be generally non-hazardous and disposed of at the Class II Monofill Facility. Any hazardous filter-cake wastes would be disposed of at an appropriate Class I landfill. Additionally, the H2S abatement system would produce about 2.5 tons per day of solid waste, most of which would be elemental sulfur. Like the filter-cake waste removed from the geothermal brine, the sulfur waste would be tested for hazardous characteristics before disposal. It is also expected that the sulfur waste would be non-hazardous and disposed of at the Class II Monofill Facility. Any load of hazardous sulfur waste would be disposed of at an appropriate Class I landfill.

The latest permitted cell at Monofill Facility will begin operation in September 2003. This cell is permitted to accept 510 tons per day of solid waste. The 123 tons per day of filter-cake and sulfur wastes that would be produced by SSU6, in addition to operational filter-cake wastes from other CE Obsidian Energy affiliates' geothermal operations, would not exceed the 510-tons-per-day limit. Therefore, there would be no short-term impacts on disposal capacity because of the filter-cake and sulfur wastes from the SSU6 Project. This permitted cell, however, would close as early as 2012. Because SSU6 would continue to operate beyond 2012, additional landfill capacity for filter-cake wastes would be permitted and constructed by the Monofill Facility, or arrangements for disposal would be made with a different landfill. The Monofill Facility has already permitted 160 acres of land for landfill use and will continue to add landfill capacity as needed. Non-hazardous filter-cake and sulfur wastes are currently not accepted by any Class III landfill in Imperial County. If the Monofill Facility is unable to accept filter-cake and sulfur wastes from SSU6, these wastes would be disposed of as hazardous waste at a Class I landfill.

Operational non-hazardous solid wastes would also include oily rages, scrap metal and plastic, insulation material, paper, glass, empty containers, and used equipment parts from maintenance activities, including used gaskets for piping flanges, pumps, spent filters, and spent turbine parts. Non-hazardous solid wastes would be recycled to the extent practical and the remainder disposed of regularly at a Class III landfill. The Allied Imperial Landfill is the Applicant's preferred landfill for non-hazardous wastes because it is the closest Class III landfill to the proposed SSU6 that accepts non-residential wastes. It is expected that the disposal of solid wastes from the facility would represent only a nominal (less than 0.1 percent) increase relative to current disposal volumes at the Class III landfill. These increases would not significantly alter the available landfill capacity and are considered a less-than-significant impact.

8.2.2 Non-Hazardous Liquid Wastes

The primary wastewater to be generated by the SSU6 Project would be clarifier effluent and cooling water blowdown (see Table 5.13-3). This wastewater would be discharged to injection wells for disposal and replenishment of the geothermal resource. Storm water from chemical storage, feed areas, and RO reject water would be collected in the brine pond prior to injection into dedicated injection wells. Additionally, oxygenated brine effluent in the clarifier would be directed to the brine pond during maintenance shutdowns and would be discharged into an injection well.

Oily liquids would be periodically pumped from the oil/water separator for disposal off site. Additionally, sludge from the septic system would be periodically removed and trucked off site for disposal.

The following summaries describe the plant's wastewater streams. Detailed summaries are presented in Section 3.3.4.3 in the Project Description.

8.2.3 Cooling Tower Wash-Down and Blow-Down

This wastewater would be injected into a dedicated injection well in accordance with regulations of the California Department of Oil and Gas.

8.2.4 Chemical Feed Area Drainage

Chemical feed area drainage consists of spillage, tank overflows, maintenance operations, and area washdowns. The chemical feed area drainage would be routed to the brine pond.

General Plant Drainage General plant drainage consists of wastewater collected by sample drains, equipment drains, equipment leakage, and area washdowns. Wastewater collected in the general plant drainage system would be routed to the brine pond. General plant drainage that potentially contains oil or grease would be first routed through an oil/water separator.

8.2.5 Clarifier Effluents

The liquid phase of the geothermal brine contains a large amount of solid material. Solids would be removed from the liquid in the clarifier, and the clarified liquid effluent would be sent to the injection wells.

Other than periodic septic pumping, no wastewater generated from the plant would require treatment at a municipal treatment facility or privately owned treatment works. Therefore, any impact to these area facilities would not be significant.

8.2.6 Hazardous Waste

Brine pond solids and scale found in pipes, clarifiers, and separators during maintenance shutdowns will be disposed of as hazardous waste, along with any cleaning agents used to remove the scale.

Waste lubricants (hydraulic fluids, oils, grease, and oily filters) would be periodically generated during operation and maintenance of the facility. Waste oil would be collected and stored in appropriate containers and recycled by an approved contractor. It is anticipated that less than 5 gallons of waste lubricants would be generated each day. Additionally, small quantities of laboratory effluents discharge to a storage tank for offsite disposal to a Class I hazardous waste landfill.

Oil/water separator sludge would likely be sent to a treatment, storage, and disposal facility (TSDF)/recycling center for recycling.

The wastewater treatment system at SSU6 includes an abatement system with an activated carbon filter that would remove benzene from brine/steam condensor gases. The activated carbon filter media would be regenerated on site about once per week using process steam. Backwash from the carbon filter would contain small quantities of benzene (1400 ppm) and this backwash water would be discharged into an injection well.

Approximately once every three years, the carbon would be shipped back to the manufacturer so that it may be reactivated. Because the carbon may be reactivated multiple times, the disposal of carbon filter media would be a rare event.

The annual volume of hazardous waste would be greatest in a year when all the spent carbon media would be sent off site for reactivation. Most of this waste would be brine pond solids (approximately 16,700 tons) and spent carbon (about 20 tons). The brine pond solids would be sent to a hazardous waste landfill, and the spent carbon would be returned to the manufacturer for reactivation. Of the remaining hazardous waste, about 7.6 tons would be recycled and 2.5 tons would be disposed of at an appropriate facility. If any filter-cake waste were found to be hazardous, the amount of disposed hazardous waste would increase. The amount of hazardous waste that would require offsite disposal would result in a nominal (less than 0.01 percent) increase relative to current disposal volumes at approved landfills in California and is considered a less than significant impact.

A summary of all operating related wastes and their expected quantities is shown on the table below:

OPERATING WASTE STREAMS AND MANAGEMENT METHODS

Waste Stream	Waste Classification	Amount[1]	Treatment
Filter-cake of brine solids from dewatering process	Non-hazardous[2]	120 tons/day	Waste disposal facility
Sulfur byproduct from H_2S abatement system	Non-hazardous[2]	2.5 tons/day	Waste disposal facility
Used hydraulic fluids, oils, grease, oily filters	Recyclable Hazardous	<5 gallons/day	Recycle
Spent batteries; lead acid	Recyclable Hazardous	2 batteries/year	Recycle
Laboratory Waste	Hazardous	600 gallons/year	Waste disposal facility
Activated carbon from Benzene Abatement	Hazardous	13,300 lb/year	Conservatively assumes return to manufacturers for replacement every 3 years
Used oil from oil/water separator	Recyclable Hazardous	100 gallons/month	Recycle
Oily rags	Non-hazardous	55 gallons/2 months	Laundry (permitted to wash oil rags)
Cooling Tower Blowdown	Non-hazardous	621,000 lbs/hr	Dedicated fluid injection well
Clarifier Effluent	Non-hazardous	9,336,000 lbs/hr	Dedicated fluid injection well
Brine Pond	Non-hazardous	2,700,000 gallons/year	Dedicated fluid injection well
Brine Pond Solids	Hazardous	16,700 tons/year	Waste disposal facility
Scale and Cleaning Solvents	Hazardous	150,000 cubic feet every 2-3 years from maintenance	Waste disposal facility

Note: All numbers are approximate

2 Waste will be tested for confirmation of non-hazardous characteristics before disposal. Non-hazardous wastes would go to the Class II Monofill Facility landfill. Hazardous wastes would be sent to a Class I landfill. Based on current operations, these wastes typically characterize as non-hazardous waste. If a market develops for these materials, they will be recycled or reused as appropriate.

9.1 Construction-Related Impacts

Based on a conservative assumption of using five 500-gallon water trucks per day for 250 days of construction per year, it is estimated that approximately 2,500 gallons per day (2 acre-feet per year [afy]) of water will be used for dust control and other construction related activities. This water would be supplied by the IID system. The IID has indicated that this water would be available and construction of the Project is not expected to significantly impact water availability.

Brine handling equipment will be contained in curbed concrete aprons, with drainage directed to the thickeners and subsequently to the aerated brine injection well.

Potential impacts to water resources during construction of the SSU6 Project Plant Facility include sediment-laden storm water runoff and potential contamination of surface waters by accidental spills of hazardous materials. Potentially minor releases to the shallow aquifer system during construction of the SSU6 Project will be avoided by the implementation of Best Management Practices (BMPs). Construction and operational activities will be performed in accordance with the California National Pollution Discharge Elimination System (NPDES) General Permit for the Discharge of Storm Water Associated with Construction Activity, and the California NPDES General Permit for the Discharge of Storm Water Associated with Industrial Activity. The NPDES General Permit for the Discharge of Storm Water Associated with Construction Activity would include development of a Storm Water Pollution Prevention Plan (SWPPP) that will implement measures to control erosion, sedimentation and release of contaminated runoff. The NPDES General Permit for the Discharge of Storm Water Associated with Industrial Activity would address potential stormwater runoff of water quality constituents specifically related to the industrial activity, and specify BMPs to control pollutant runoff. An erosion control plan will be used at the site during the construction phase to control sediment-laden runoff and ensure the integrity of the storm water collection system during construction. The plan will use control measures, as necessary, which may include grass-covered swales and ditches, stabilized construction entrances, gravel-covered construction lay down area, silt fencing, and seeding of the disturbed area). Specifically, runoff from all affected areas will be diverted to the erosion control measures before discharging off site.

Upon completion of the project, areas disturbed by construction will be stabilized. After sediment removal and stabilization of the site, all construction sediment control measures will be removed. Therefore, potentially significant impacts to water resources during construction of the SSU6 Project plant facility are not anticipated.

9.2 Operation-Related Impacts

The operation of the SSU6 Project would use approximately 293 afy of IID canal water. The IID has indicated that this water is available. Additionally, the SSU6 Project would convert approximately 173 acres of agricultural land to industrial use. Currently, approximately 5 afy per acre of IID canal water is delivered to the project site for agricultural irrigation, or about 865 afy for 173 acres. Based on current project design, the SSU6 Project would result in a savings of approximately 572 afy of IID irrigation water.

It should be noted that these water requirement estimates are based on a project design case of 23.5 percent salinity in the brine. However, the salinity of the brine may vary, in which case water demand could vary accordingly. In the very unlikely event that the salinity reaches the maximum of 25.0 percent, the corresponding water demand could reach 987 afy. Although these conditions are not expected, IID has indicated that adequate water is available to serve the project under these conditions. The Applicant would pay a higher rate for water above the current usage to fund IID water conservation projects.

Consequently, the SSU6 Project would not result in a significant impact to water availability.

9.3 Site Grading and Drainage

The site is fairly level. The proposed drainage design in general will flow from the southeast corner to the northwest corner toward the drainage detention pond in the northwest corner.

Within the actual project site, buildings and equipment are constructed on foundations with the overall site grading scheme designed to route surface water around and away from all equipment and buildings. The storm water drainage system is sized to accommodate 3 inches of precipitation in a 24-hour period (100-year storm event) and to comply with applicable local codes and standards. Buildings and equipment are constructed in a manner that provides protection from such a 100-year storm.

Storm water flows will be directed to the detention pond via ditches, swales, and culverts. Spill containment areas and sumps subject to spills of miscible chemicals would be drained to an enclosed oil/water separator. Oil from this oil/water separator would be collected in a waste oil tank for offsite recycling. Clean water from the oil/water separator would be discharged into the thickener.

After completion of the SSU6 Project plant facility, releases from the RPF, including the clarifier and brine collection ponds, could potentially impact the quality of the local water resources. The SSU6 Project will include two 770-foot x 90-foot x 10-foot-deep brine ponds. Under normal operating conditions, the brine would be discharged directly into the injection wells. However, during upset conditions, production brines would be discharged into the brine ponds. The ponds would be of earth construction and lined with an HDPE liner and concrete. Monitoring wells will be placed at the periphery of the ponds. The ponds would be designed in accordance with Title 27, Division 2 of the California Code of Regulations (CCR) – Special Requirements for Surface Impoundment and permitted as a waste management unit (WMU) by the RWQCB. A release from these ponds or their associated systems could impact water resources by infiltrating into the underlying groundwater system and migrating overland toward the Salton Sea. However, because these ponds will be concrete and HDPE lined with the goal of preventing their contents from leaching into the soil, potentially significant impacts to water resources during operation of the ponds is not anticipated. Reject water from the RO system would also be discharged to the brine pond at an approximate rate of 720 gpd.

9.4 Flood-Related Impacts

The site facility is within the 100-year flood zone. A 100-year storm event could impact the site facility. The entire site will be enclosed by an 8-foot high perimeter berm constructed with 2:1 (horizontal:vertical) sloping sides to protect the plant from flooding. Therefore, potentially significant flood-related impacts to the SSU6 Project are not anticipated.

9.5 Storm Water Related Impacts

Storm water runoff could result in erosion and sediment deposition, and water quality impacts. The SSU6 Project site facility within the bermed area will be graded to direct surface water runoff toward the northwest corner of facility toward a constructed earthen detention basin. The detention basin will be designed for 3 inches of precipitation in a 24-hour period (100 year storm conditions). Storm water flows will be directed to the detention basin via ditches, swales and culverts. Storm water flows from areas of the facility with potential for oil contamination will be directed to an oil/water separator before discharge into the detention basin. Therefore, potentially significant storm water related impacts from the site are not anticipated. Regulatory requirements for storm water during SSU6 Project operations will be guided under the NPDES Industrial Permit. Because the detention basin is designed not to discharge under a 100-year storm condition, a separate NPDES permit is not required.

9.6 Transmission Line Impacts

Potentially significant impacts to water resources during construction of the L-Line Interconnection are not anticipated. Potentially minor erosion-related or hazardous materials related impacts to water resources during construction of the L-Line Interconnection will be mitigated by the implementation of BMPs during its construction. Construction activities will be performed in accordance with the California NPDES General Permit for the Discharge of Storm Water Associated with Construction Activity.

Operation, including maintenance of the L-Line Interconnection is not anticipated to impact water resources.

9.7 Production and Injection Well Pads

9.7.1 Construction-Related Impacts

During drilling activities to install both the brine production and injection wells, it is anticipated that drilling fluids will be introduced into the boreholes to lubricate and cool the drilling string, flush out drill cuttings and promote borehole stability. These fluids typically contain relatively inert additives to increase the density of the fluid to facilitate flushing of drill cuttings, promote borehole stability, and if necessary, to seal pores to inhibit fluid loss into the surrounding country rock. Additionally, by virtue of their designed nature, drilling fluids carry drill cuttings and can acquire chemical components of the penetrated material. Although the target depths of both the brine production and injection wells are much deeper than the relatively shallow overlying aquifer, there is the potential for drilling fluids to impact the groundwater aquifer system. However, with implementation of BMPs and engineering controls, including casing shallow portions of the production and injection wells, potential impacts to the quality of relatively shallow groundwater during construction of production and injection well pads are not anticipated.

9.7.2 Operation-Related Impacts

After the brine production and injection wells are completed, geothermal fluids would be delivered from relatively deep production depths (7,400 feet) through overlying material including other shallower aquifers to the surface and then, after clarifying treatment and power production, heat-depleted brines would be re-injected at greater depths than they were originally extracted. Without proper controls, the produced and re-injected fluids have the potential to impact the quality of groundwater in the relatively shallow aquifer systems these wells penetrate. However, with implementation of engineering controls, including casing shallow portions of the production and injection wells, significant impacts to groundwater during operation of production and injection well pads is not anticipated.

Drainage network and water supply canals rely on gravity induced flow and have little tolerance for topographic change. If significant land subsidence occurred because of extraction of geothermal brines, this could have potentially serious impacts to surface water drainage patterns. The re-injection of brine would minimize land subsidence and impacts to surface water flows are expected to be less than significant.

9.8 Production and Injection Pipelines

Potentially significant impacts to water resources during construction of the production and injection pipelines are not anticipated. The impact to water resources via erosion, sedimentation or release of construction related materials during construction of the pipeline would be mitigated by the implementation of Best Management Practices specified in the SWPPP. Construction activities will be performed in accordance with the California NPDES General Permit for the Discharge of Storm Water Associated with Construction Activity Operation-Related Impacts

The quality of water transported in the production pipelines is anticipated to be similar to the composition summarized in Table 3.3-1. The quality of water in the injection pipelines is summarized in Table 3.3-2. Any release from these pipelines would have the potential to impact shallow ground water or nearby surface waters. Mitigation measures include a protective pipeline design, a detailed inspection routine, preparation of a release response plan, and expeditious containment, control, and cleanup of released liquids. These mitigation measures would reduce potential impacts to water resources, during operation of the pipelines, to less than significant.

9.9 Water Supply Pipeline

9.9.1 Construction-Related Impacts

Potentially significant impacts to water resources during construction of the water supply pipeline are not anticipated. The impact to water resources via erosion, sedimentation or release of construction related materials during construction of the pipeline would be mitigated by the implementation of Best Management Practices specified in the SWPPP. Construction activities will be performed in accordance with the California NPDES General Permit for the Discharge of Storm Water Associated with Construction Activity.

9.9.2 Operation-Related Impacts

Operation of the water supply pipeline is not anticipated to have the potential to significantly impact the quality of underlying water resources. Surface water effects, additionally, are not anticipated to have a significant impact. Intake quantities will be allocated based on IID. IID has confirmed the availability of water and approved a water supply agreement to provide the required water for the facility operations. RO wastewater will be discharged to the brine pond and will ultimately be discharged into an injection well. The impact from RO wastewater being reinjected will be similar to that of the general injection of brine waters.

10.0 Project Features to Avoid or Reduce Environmental Impacts

The SSU6 Project has been designed and engineered with numerous features to avoid or reduce potential environmental impacts. A summary of these features follows:

Water Resources	
Water Conservation	Extensive use of steam condensate to minimize water demand from outside sources.
Construction-Phase Erosion Control Plan	An erosion control plan will be used at the site during the construction phase to control sediment-laden runoff and ensure the integrity of the storm water collection system during construction. The plan will use control measures, as necessary, such as grass-covered swales and ditches, stabilized construction entrances, gravel-covered construction lay down area, silt fencing, and seeding of the disturbed area. Specifically, runoff from all affected areas will be diverted to the erosion control measures before discharging off site
HDPE and Concrete-Lined Brine Ponds	Brine ponds will be of earth construction and lined with an HDPE liner and concrete such that the contents will not leach into the soil.
Brine Pond Monitoring Wells	Potential release from the brine ponds to groundwater will be assessed with a system of monitoring wells placed around the periphery of the ponds
Perimeter Dike	The entire site will be enclosed by an 8-foot high perimeter dike constructed with 2:1 (horizontal: vertical) sloping sides to protect the plant from flooding.
Storm Water Runoff Drainage Pond	The SSU6 Project site facility will be in a bermed area graded to direct surface water runoff toward an earthen drainage pond designed for 100-year storm conditions. Storm water flows with potential for oil contamination will be directed to an oil/water separator before discharge into the drainage pond.
Production and Injection Best Management Practices	Best Management Practices (BMP) will be developed and implemented for construction, post-construction, and operational phases to maintain the integrity of the drilling fluid handling systems, and run-off.
Casing Shallow Portions of Production and Injection Wells	Casing the shallow portions of the production and injection wells with casings will minimize potential release of both construction-related drilling fluids and production-related geothermal brines to the shallow groundwater aquifer.
Protective Pipeline Design and Detailed Inspection Routine	Production and injection pipelines will be constructed of concrete lined carbon steel, and routinely inspected, to prevent potential releases. Double-walled pipe will be used at the areas of sensitive wetlands.
Pipeline Isolation Valves	Pipelines at each wellhead will be equipped with remotely operated electrical emergency shutoff valves, as well as manual alloy isolation valves to prevent potential releases.

The following figures from the AFC accompany this application:

3.1-2

5.4-A, 5.2-B, 5.4-C, 5.4-D, 5.4-E

3.1-4

3.3-9

3.3-7

3.3-1A